



Development Permit

DP2302A (May)

Date: May 17, 2023

Issued pursuant to Section 490 and 491 of the *Local Government Act*

1. This Development Permit is issued to Bevan and Rhonda May of 10377 Highway 3A, Sanca, BC as the registered owner (hereinafter called the "Permittee") and shall only apply to those lands within the Regional District of Central Kootenay, in the Province of British Columbia legally described as LOT 2 DISTRICT LOT 4595 KOOTENAY DISTRICT PLAN 4523 (PID 010-421-874) as shown on the attached Schedules 1 and 2, forming part of this Permit, referred to hereafter as the "said lands".
2. This Development Permit is issued subject to compliance with all of the bylaws of the Regional District of Central Kootenay applicable thereto, except as specifically varied or supplemented by this Permit.
3. This Development Permit shall not have the effect of varying the use or density of land as specified in the applicable Zoning Bylaw of the Regional District of Central Kootenay, nor a Floodplain Specification under Section 524 of the Local Government Act.
4. The said lands have been designated 'Country Residential' and are located within a Development Permit Area pursuant to the Comprehensive Land Use Bylaw No. 2316, 2013 as amended.
5. The Permittee has applied to the Regional District of Central Kootenay for an Environmentally Sensitive Development Permit in order to and to undertake remediation for unauthorized works. Pursuant to this Development Permit and subject to the terms and conditions herein contained, as well as all other applicable Regional District Bylaws, the Regional District of Central Kootenay hereby authorizes the use of the said lands for this remediation work.
6. The Permittee is required to obtain approval in writing from the Regional District of Central Kootenay prior to the construction any new buildings, external additions to existing buildings or for any deviation from the development authorized under Section 5 and Schedule 2 of this Development Permit. Furthermore, the Permittee is hereby advised of the following requirements:
 - 6.1 The Regional District of Central Kootenay Building Department requires that the Permittee obtain a demolition permit and/or building permit prior to the removal of any existing buildings and structures, the renovation, expansion or alteration of any existing building and the construction of any new building.
 - 6.2 Unless otherwise stated all buildings and structures shall comply with the site coverage, height of building and building setback requirements of the Country Residential zone of Regional District of Central Kootenay Comprehensive Land Use Bylaw No. 2316, 2013 as amended.
 - 6.3 Development is authorized in accordance with "10377 HWY3A – Site Plan" prepared by Keefer Ecological Services, dated 2023-04-30.
 - 6.4 Development is authorized in accordance with the terms described in the following reports:
 - 6.4.1 "Remediation Plan, 10377 Highway 3A, Gray Creek, BC" prepared by Keefer Ecological Services LTD and dated November 21, 2022 and attached to this permit as Schedule 3.

- 6.4.2 “RE: Riparian Area Assessment – 10377 Highway 3A, Gray Creek, BC” prepared by Michael Keefer, PAg and dated March 06, 2023 and attached to this permit as Schedule 4.
- 6.4.3 “RE: Boathouse Removal – 10377 Highway 3A, Gray Creek, BC” prepared by Michael Keefer, PAg and dated May 12, 2023 and attached to this permit as Schedule 5.
- 6.4.4 “Riparian Area Assessment Report, 10377 Highway 3A, Gray Creek, BC” prepared by Keefer Ecological Services LTD and dated January 13, 2022 and attached to this permit as Schedule 6.
- 6.4.5 “Riparian Area Management Plan, 10377 Highway 3A, Gray Creek, BC” prepared by Keefer Ecological Services LTD and dated January 24, 2022 and attached to this permit as Schedule 7.
- 6.4.5.1 Compliance with all recommendations is required. Recommendations can be categorized as follows:
- 6.4.5.1.1 The rock berm should be reprofiled to the natural, pre-construction foreshore geometries (reduced height and more gradual slope), using past photos and the surrounding shoreline as a guide. Larger rocks (>40 cm) should be returned to the foreshore for fish habitat to mimic pre-construction site conditions, while smaller rocks can be stored above the high-water mark by creating a talus-like habitat area for revegetation.
- 6.4.5.1.2 During construction, a path should be created at the southern end of the berm by pulling rock fragments from the top portion down to allow access for the machine to ascend the rock berm (Appendix A: Figure 18). Once stably on top, the machine should safely deconstruct the pile by moving rocks to the eastern side of the berm and stockpiling rocks to be returned to the foreshore.
- 6.4.5.1.3 When placing rocks around the birch tree, care must be taken to ensure its continued survival (Appendix A: Figure 14). If the removal of the birch is necessary for safe rock removal, then birch plugs must be planted in replacement
- 6.4.5.1.4 Above the high-water mark, a channel no greater than 3 m wide can remain clear of rock fragments.
- 6.4.5.1.5 The site will be deliberately over-planted to account for the expected mortality of juvenile plants.
- 6.4.5.1.6 After re-grading the rock berm, topsoil should be placed in locations (determined by the QEP) between and under the rock fragments. Kinnikinnick (*Arctostaphylos uva-ursi*) plugs should be planted at one plug per square meter.
- 6.4.5.1.7 The character of the rock berm will be modified through the removal of larger rock pieces (>40 cm), an activity that will reduce the height of the berm and make it more stable in the long term, as well as make it suitable for planting.

- 6.4.5.1.8 Atop the rock berm, twelve trees (six ponderosa pine and six Douglas fir) should be planted at a 2 m spacing to replace the trees removed during construction. If the birch sapling is harmed during the recontouring of the rock berm, then two birch trees should be planted in replacement to maintain adequate microsites. The total number of trees is inflated to account for a 50% survival rate following planting. The juvenile trees should be planted as container stock in the spring of 2023. In addition, any added topsoil should be covered with mulch to prevent erosion and maintain sufficient soil moisture.
- 6.4.5.1.9 Invasive species plant management should continue per the Riparian Area Management Plan in January 2022
- 6.4.5.1.10 A QEP should visit the site pre-construction, during, and post-construction
- 6.4.5.1.11 It is recommended to have a QEP on-site at least once during the rock berm works to direct the selection and placement of rock for fish habitat on the foreshore.
- 6.4.5.1.12 If construction is expected to take longer than five days, a second site visit is recommended to ensure remediation activities are still on track before completion.
- 6.4.5.1.13 Post-completion monitoring of the site is recommended for two growing seasons following revegetation. It should consist of one site assessment by a QEP each spring/summer.
- 6.4.5.1.14 Monitoring for invasive species must also take place. The absence of Scotch broom and spotted knapweed is a priority as they can negatively affect the establishment of the targeted native plant species.
- 6.4.5.1.15 All site personnel will be informed of their obligation to protect the terrestrial, aquatic and drinking water values at the assessed property through the proposed work. This includes limiting disturbance footprints within the SPEA, and operating from above the TOB whenever practicable.
- 6.4.5.1.16 Spill response, if required, will follow provincial guidelines.
- 6.4.5.1.17 Cleaning procedures will be implemented for all incoming equipment, including footwear, to avoid the introduction of both terrestrial and marine invasive plant species. Equipment will not be permitted to perform work on the assessed property if it is not free from mud, debris, vegetation, etc.
- 6.4.5.1.18 Vegetation removal will be minimal and only as required.
- 6.4.5.1.19 Spotted knapweed (*Centaurea stoebe*) should be manually removed and chemically controlled, with extra care taken in its application given the proximity to the high water mark. Existing

spotted knapweed skeletons should be carefully removed in such a manner that reduces the likelihood of spreading seeds in the process. Scotch broom (*Cytisus scoparius*) should also be removed through manual and chemical means. Plants should be dug or pulled, taking care to remove as much of the root as possible. Scotch broom may also be controlled via chemical means in the spring.

- 6.4.5.1.20 The authoring QEP will be on site for the start of the proposed work to communicate requirements and expectations, and to observe the work procedures.
 - 6.4.5.1.21 The QEP will direct, observe and record details of the work that occurs while on site, including details of a pre-construction kickoff meeting (when, where, who, topics discussed, questions asked, etc.), equipment inspection, any changes to the work plan, mitigation measures implemented, the effectiveness of those mitigation measures, and the amount of work completed while on site.
 - 6.4.5.1.22 Any work that occurs without direct supervision of the QEP will be documented by the property owner and submitted to the QEP for inclusion in the Project Completion Report.
 - 6.4.5.1.23 Daily updates will be provided to the QEP for work that is conducted without direct oversight, and all documentation will be shared with the QEP for inclusion in the final report. The RDCK may require the QEP to conduct a post-construction site visit.
 - 6.4.5.1.24 The QEP will draft a Project Completion Report following the completion of all permitted works at the site.
 - 6.4.5.1.25 No offsetting donation is requested or required by the Regional District of Central Kootenay for this permit.
7. As a condition of the issuance of this Permit, the Regional District shall hold an irrevocable Letter of Credit submitted by the Permittee in the amount of \$9287.50 to ensure the landscaping requirements as set forth in Section 6 are completed and in accordance with the following provisions:
- 7.1 A condition of the posting of the Letter of Credit is that should the Permittee fail to carry out the works and services as herein above stated, according to terms and conditions of this permit within the time provided, the Regional District may use the Letter of Credit to complete these works or services by servants, agents or contractors, and any surplus shall be paid over to the Permittee. If the amount of funds is insufficient to cover the actual cost of completing the works, then the Permittee shall pay such deficiency to the Regional District immediately upon receipt of the Regional District's bill for same.
 - 7.2 The Permittee shall complete the landscaping works required by this Permit prior to May 17, 2025. Within this time period the required landscaping must be inspected and approved by the Regional District.
 - 7.3 If the landscaping is not approved within this time period, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is completed or has

the option of drawing from the Letter of Credit to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter into the property to undertake the required landscaping for which the Letter of Credit was submitted.

- 7.4 If the landscaping is approved within this time period without the Regional District having to draw the on the Letter of Credit, 90% of the original amount of the Letter of Credit shall be returned to the Permittee.
- 7.5 A hold back of 10% of the original amount of the Letter of Credit shall be retained until a final inspection is undertaken within 12 months of the date of the original inspection and approval was given to the landscaping. If the landscaping receives approval at final inspection, the 10% hold back will be returned to the Permittee. If after the final inspection, approval of the landscaping is not given, the Regional District has the option of continuing to renew the Letter of Credit until the required landscaping is approved or has the option of drawing on the Letter of Credit the funds to complete the required landscaping. In this event, the Regional District or its agents have the irrevocable right to enter onto the property to undertake the required landscaping for which the Letter of Credit was submitted.
8. The said lands shall be developed strictly in accordance with the terms and conditions of this Development Permit and the requirements of all applicable Regional District Bylaws as well as any plans and specifications which may, from time to time, be attached to this Permit shall form a part thereof.
9. In accordance with the Local Government Act, if the development authorized by this Development Permit is not commenced within two years of the date of this Permit, this Permit shall lapse.
10. In accordance with the Local Government Act, 'Notice' shall be filed in the Land Title Office that the said lands are subject to this Development Permit.
11. The terms of this Development Permit including subsequent amendments, are binding on all persons who acquire an interest in the said lands associated with this Permit.
12. It is understood and agreed that the Regional District has made no representations, covenants, warranties, guarantees, promises, or agreement (verbal or otherwise) with the Permittee other than those in this Development Permit. It is solely the responsibility of the Permittee to ensure that the requirements of all other applicable government agencies are satisfied.
13. This Development Permit does not constitute a building permit.
14. This Development Permit shall come into force and effect 14 days after the date of issuance unless a Waiver of Appeal is received from the Permittee at which time the Development Permit shall be deemed to be issued upon receipt of the Waiver of Appeal. OR If a Notice of Appeal is received the Development Permit shall be suspended until such time as the Board of the Regional District of Central Kootenay has decided the Appeal.

S Sudan

Sangita Sudan, General Manager of Development and Community Sustainability Services

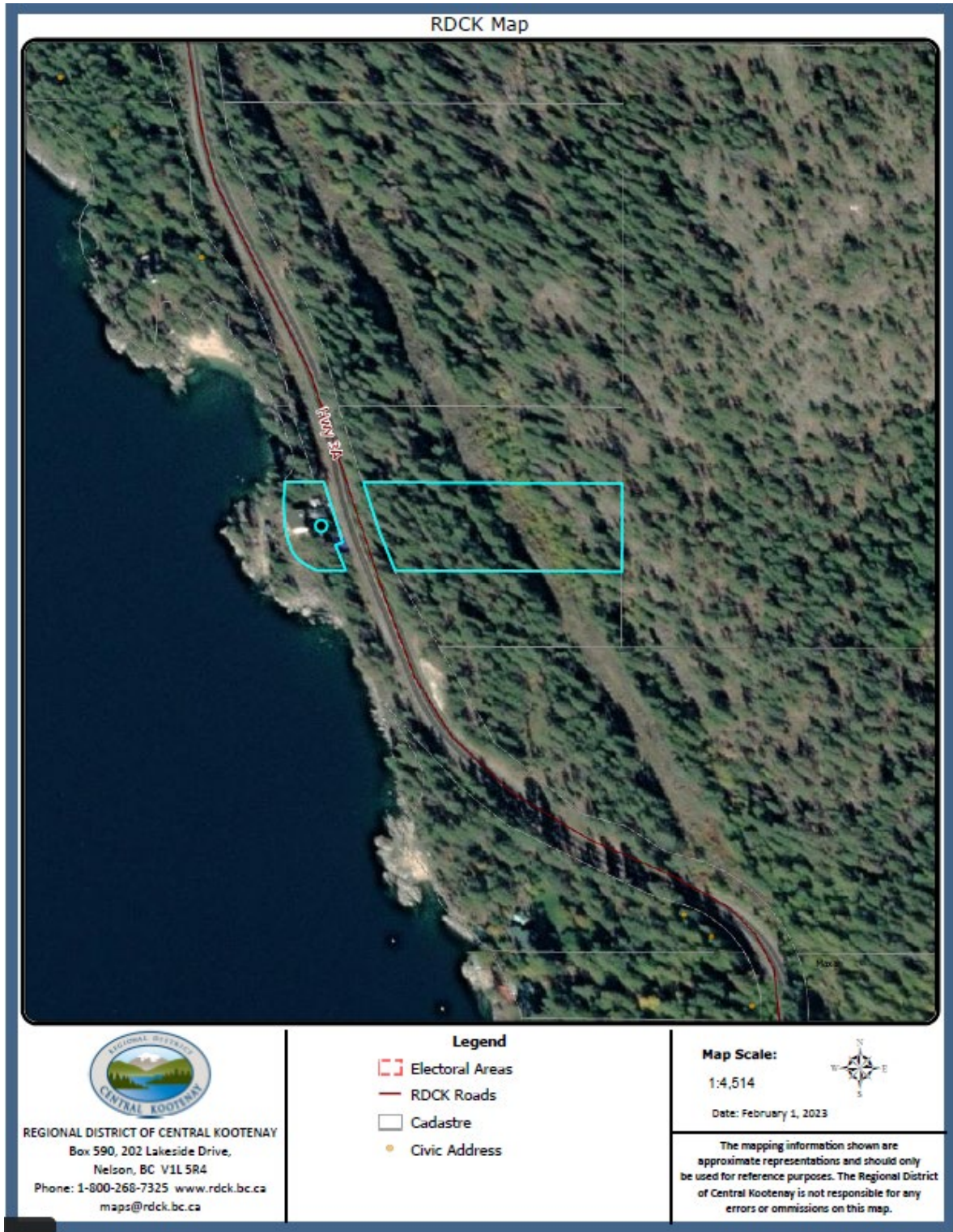
May 26, 2023

Date of Approval (date of review and approval)

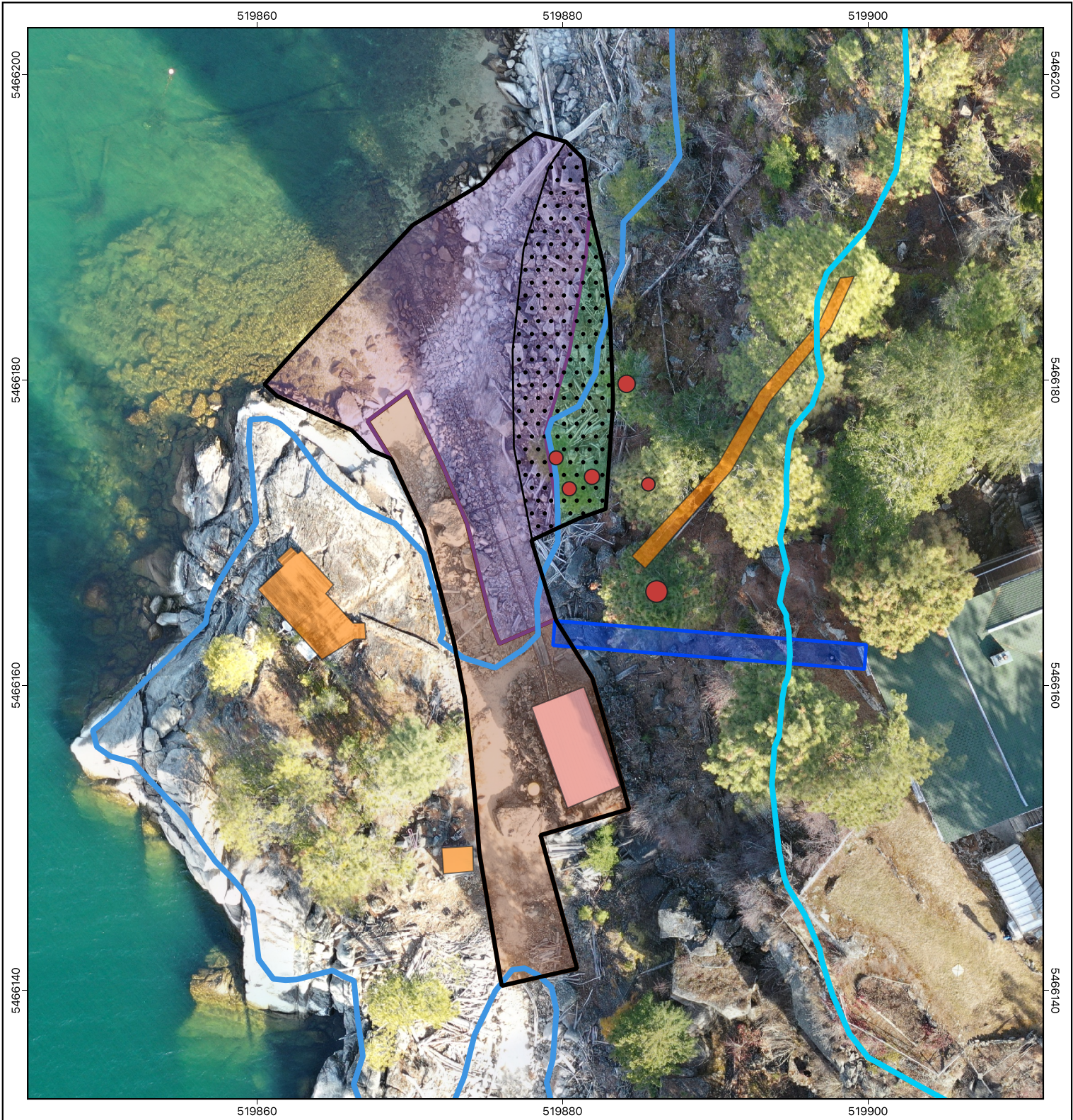
May 30, 2023

Date of Issuance (pending receipt of securities)

Schedule 1: Location Map



Schedule 2: "10377 HWY3A – Site Plan" prepared by Keefer Ecological Services, dated 2023-04-30.

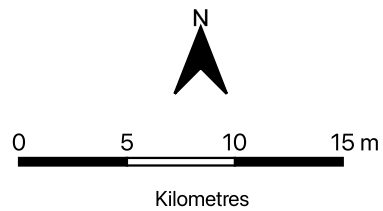


10377 HWY3A - Site Plan

- 15m ESDP Area Boundary
- High Water Mark
- Disturbance Area
- Fallen Trees
- Rock Berm

- Site Structures**
- Removed
 - Standing

- Proposed Works**
- Boulder & Cobble Placement
 - Revegetation
 - Clear Zone
 - Funicular



Scale 1 : 350
 Coordinate System: NAD 1983 UTM Zone 11N



Created by:
 Keefer Ecological Services Ltd.
 Date: 2023-04-30

Schedule 3: *“Remediation Plan, 10377 Highway 3A, Gray Creek, BC”* prepared by Keefer Ecological Services LTD and dated November 21, 2022

Remediation Plan

10377 Highway 3A, Gray Creek, BC

Michael Keefer, MSc, PAg; Baylie Sjodin, MEP, EPT; Brenley Yuan, MSc, RPBio
November 21, 2022



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Background

In March 2021, Keefer Ecological Services Ltd. (KES) conducted a riparian area assessment (RAA) at 10377 Highway 3A in Sanca, B.C. (Appendix B). The Qualified Environmental Professional (QEP), Jessica Lowey, MSc, PAg, used the Riparian Areas Protection Regulation (RAPP) simple assessment method to calculate a Stream Protection and Enhancement Area (SPEA) of 15 m from the natural lake boundary (i.e., high-water mark).

The RAA's primary purpose was to propose management and mitigation measures for constructing a funicular, dock, and gangway for an Environmentally Sensitive Develop Permit (ESDP) through the Regional District of Central Kootenay (RDCK) Land Use Bylaw (No. 2315, 2015). All activities were proposed to occur within the SPEA and below the natural lake boundary. Upon receiving the ESDP, the QEP supplied the property owner with an updated Riparian Area Management Plan for construction activities (Appendix C). In March 2022, a QEP monitored construction activities per the Riparian Area Management Plan and found activities to comply with the plan. This remediation plan is in response to works that exceeded the scope outlined in the Riparian Area Management Plan, which occurred outside QEP monitoring.

In June 2022, the Ministry of Forests (MoF), the Department of Fisheries and Oceans Canada (DFO), and the Ktunaxa Nation Council (KNC) raised concerns about the activities that occurred at the site. Concerns from the above governing bodies included:

- The location of a fuel tank near the lakeshore,
- Excessive altering of fish habitat and the riparian zone, and
- The creation of a rock berm with the potential to trap fish.

Michael Keefer, a Professional Agrologist (PAg), has acted as the QEP for developing the remediation plan for this property. Michael is in good standing with the British Columbia Institute of Agrologists (BCIA) in the practice of ecological restoration. Michael is supported by Brenley Yuan, a Registered Professional Biologist (RPBio) with a background in fish habitat restoration. In the professional opinion of the QEPs, if the remediation outlined below is implemented as proposed by this plan, there will be no foreseeable harmful alteration, disruption or destruction of natural features, functions, and conditions that support fish life processes in the riparian assessment area.

Timeline of Activities

Construction began on March 4, 2022, and continued until April 30, 2022. Planned activities during this time included removing the existing boathouse, marine railway, and several large boulders for the foundation of the funicular, the safe operation of machinery, and future boat access. KES monitored one day of construction on March 14, 2022, to ensure compliance with the management and mitigation plans. All other activities have been self-reported by the property owner. Future construction will include the installation of the funicular in spring 2023.

Table 1. A daily log of construction activities on site

Date	Actions
March 4, 2022	<ul style="list-style-type: none"> ● Excavator unloaded on-site (Appendix A: Figure 1) ● Fuel tank secured near shore ● Note to move large boulders coming up the shore for the machine to pass before the fuel tank can be relocated away from the water
March 5, 2022	<ul style="list-style-type: none"> ● Begin breaking large boulders up the shoreline <ul style="list-style-type: none"> ○ Sufficient to allow machinery to pass
March 11, 2022	<ul style="list-style-type: none"> ● Breaking and removal of the boulder at the apex of the peninsula <ul style="list-style-type: none"> ○ Boulder was precluding clearing stone from away from boathouse base) ○ Clearing revealed that the boathouse foundation was poor, and dismantling was required ○ Further removing boulders on the south side of the boathouse required ● Set up dust control water pump
March 13, 2022	<ul style="list-style-type: none"> ● Cleared machine pathway of rubble (Appendix A: Figure 2 & Figure 3) <ul style="list-style-type: none"> ○ Through the south channel and up to the boathouse ○ The path was widened for the passage of the machine, so the material removed could be placed higher
March 14, 2022	<ul style="list-style-type: none"> ● KES QEP and a KES staff member arrive on site (Jessica Lowey & Danielle Smart) <ul style="list-style-type: none"> ○ QEP observes work to date ● QEP observes the hammering of large boulders and the funicular base area with and without a water system <ul style="list-style-type: none"> ○ QEP recommends using a water system for dust control ● QEP reviewed invasive species present on-site and a management plan ● QEP departs ● Continue to remove boulders from around the south side of the boathouse ● Material from around the boathouse was distributed along the south channel ● Clearing around the north channel to facilitate proper further cleanup and removal of prominent large boulders (Appendix A: Figure 4) ● Job is 80% complete
March 15, 2022	<ul style="list-style-type: none"> ● Remaining residual hammering pile on the west side of the north channel ● Job is 98% complete
March 16 – 27, 2022	<ul style="list-style-type: none"> ● Minor cleanup and smoothing (Appendix A: Figure 5, Figure 6, & Figure 7)
March 30, 2022	<ul style="list-style-type: none"> ● Dismantled boathouse (Appendix A: Figure 8)
April 24, 2022	<ul style="list-style-type: none"> ● Continued rock removal from near water edge to ensure safe boating operations (Appendix A: Figure 9)
April 25 – 30, 2022	<ul style="list-style-type: none"> ● Removal of stones impacting marine railway

Regulatory Notice

On June 21, 2022, an email from the Ministry of Forests was sent to the property owner with an immediate Stop Work Order. Construction activities have halted until remediation requirements have been met. The email highlighted the following concerns with the Provincial permit approval:

- The location of the fuel tank within the restricted 30 m of the lakeshore (per Clause N)

- The removal of excess boulders from below the high-water mark to above the high-water mark (per Clause G)
- The approval and registration of an accretion survey (per Clause D)

Current Conditions

On June 20, 2022, the property owner contacted the QEP via email. In the email, the proposed construction activities were cited to be complete for 2022. It was noted that more materials had been moved on the foreshore than initially estimated. The property owner requested that the QEP visit the site for an evaluation of works completed and any recommendations before the scheduled departure of the machinery in September 2022. Correspondence regarding the concerns mentioned above was also shared with the QEP.

On June 30, 2022, QEP Michael Keefer and Baylie Sjodin visited the site with the property owner. The water level on Kootenay Lake was 533.10 m, slightly less than the peak level of 533.89 m on June 15, 2022 (FortisBC, n.d.).

Terrestrial

Machine Path

Terrestrial conditions were assessed as those above the natural lake boundary (i.e., high-water mark). A path approximately 10 m wide was observed from north to south connecting the two channels on-site (Appendix A: Figure 10). The path was predominantly sand with minimal coarse rock fragments and no coarse woody debris above the natural lake boundary (Appendix A: Figure 11). No vegetation was seen growing in the sandy area.

Tree Removal

The property owner reported removing three ponderosa pine (*Pinus ponderosa*) and three Douglas fir (*Pseudotsuga menziesii*) trees on-site due to damage from a storm during the 2021-2022 winter. The QEP confirmed the location along the north channel's eastern shore (Appendix A: Figure 12). No other vegetation was observed to be removed along the shoreline during construction.

Rock Berm

A rock berm approximately 1-2 m tall, 25 m long, and 5-10 m wide was observed along the eastern shore of the north channel (Appendix A: Figure 13). The berm was built of rock material removed during construction ranging from 10-100 cm in diameter at an approximate 75% (or 36°) slope. The berm covered a stretch of natural vegetation approximately 1 m wide along the shoreline. One young paper birch (*Betula papyrifera*) appeared unharmed by the surrounding rock fragments (Appendix A: Figure 14). No vegetation appeared to be growing on the berm at the time of the site visit, other than the birch sapling.

Boathouse

Rocks along the west and south perimeter of the dismantled boathouse were removed and appear to be added to the rock berm. Rock fragments along the dismantled boathouse's east perimeter appeared undisturbed (Appendix A: Figure 15).

Invasive Species

Spotted knapweed (*Centaurea stoebe*) and downy brome (*Bromus tectorum*) were observed on-site along the footpath leading from the house to the site, beginning approximately 10 m north-east of the dismantled boathouse (Appendix A: Figure 16).

Aquatic

Foreshore

The foreshore was assessed as the area between the high- and low-water mark, starting at the natural lake boundary for approximately 25 m north. All rock fragments under 15 cm in diameter appeared to be removed along the northern channel's foreshore (Appendix A: Figure 9). Some coarse woody debris was observed to have been deposited with the receding lake level.

The rock berm was observed to cover a 1-5 m wide foreshore section along the north channel's eastern edge. Rock fragments in the foreshore varied from 10-100 cm in diameter. The northern portion of the rock berm gradually slopes downward to meet the natural ground of the foreshore. During high water levels, there is a potential for water to pool behind the rock berm and trap fish. Woody debris was observed to have collected behind the rock berm during the peak high-water levels in early June, providing evidence for the potential for fish entrapment (Appendix A: Figure 17). No vegetation appeared to be growing on the berm foreshore at the time of the site visit.

Fish Habitat

All rock fragments under 15 cm in diameter appear to be removed in the northern channel spanning an approximate distance of 10 m wide and 25 m long north of the natural lake boundary (Appendix A: Figure 9). As determined in the RAA report, previous site conditions held the potential for juvenile fish rearing habitat (Appendix B). Consequently, the removal of all rock fragments may impact fish rearing habitat on-site by:

- reducing habitat complexity,
- reducing benthic macroinvertebrate foraging opportunities,
- destabilizing foreshore sediments,
- burying food organisms,
- and altering normal shoreline currents, deposition patterns, plankton, and fish movements (Fisheries and Oceans Canada, 2002; Randall et al., 2011; Schleppe & Arsenault, 2006).

Furthermore, adding a hard, steepened shoreline by the rock berm further reduces habitat complexity and alters energy dissipation dynamics, possibly leading to instability (Kahler et al., 2000; Schleppe & Arsenault, 2006).

No vegetation appeared to be growing on the foreshore. Minimal coarse woody debris has collected along the foreshore and at the lake's edge (Appendix A: Figure 11).

Remediation

The overall goals of the remediation plan for the assessed property are modification of the topography to support the establishment of native species and the restoration of juvenile fish rearing habitat. It is recommended that the property owner remediate the impacts of construction activities above and below the natural lake boundary. Detailed actions are described below and include plans to:

- Reduce the height and slope of the rock berm while creating suitable microsites for the installation of native plants,
- Eliminate the potential for fish entrapment potential behind the rock berm,
- Plant vegetation on and around the levelled rock berm, and
- Redistribute larger rock fragments below the natural lake boundary for fish habitat.

Rock Berm

The rock berm should be reprofiled to the natural, pre-construction foreshore geometries (reduced height and more gradual slope), using past photos and the surrounding shoreline as a guide. Larger rocks (>40 cm) should be returned to the foreshore for fish habitat to mimic pre-construction site conditions, while smaller rocks can be stored above the high-water mark by creating a talus-like habitat area for revegetation. Special care should be taken to eliminate existing fish stranding opportunities and prevent new ones from being created. Specifically, the northern end of the berm should be levelled with the eastern shoreline to eliminate the potential for fish entrapment during high water in the spring.

During construction, a path should be created at the southern end of the berm by pulling rock fragments from the top portion down to allow access for the machine to ascend the rock berm (Appendix A: Figure 18). Once stably on top, the machine should safely deconstruct the pile by moving rocks to the eastern side of the berm and stockpiling rocks to be returned to the foreshore. When placing rocks around the birch tree, care must be taken to ensure its continued survival (Appendix A: Figure 14). If the removal of the birch is necessary for safe rock removal, then birch plugs must be planted in replacement (see the Vegetation section below).

Fish Habitat

The area below the natural lake boundary should be restored to its natural state as much as possible (according to a QEP) while maintaining reasonable navigability. This would result in select areas of the altered foreshore being returned to cobble substrate, occasionally interspersed with larger boulders (diameters 30 cm or greater) at a minimum frequency of one boulder per 0.5 m² where possible. The total remediation area substrate composition and frequency of large boulders should mimic pre-construction conditions (while maintaining navigability), using past photos and surrounding shorelines as a guide. Before remediation construction begins, we recommend a QEP conduct a site assessment to evaluate whether cobble substrate management will be required beyond the natural accumulation that

has occurred since construction activities ceased. Above the high-water mark, a channel no greater than 3 m wide can remain clear of rock fragments.

Given the previous conditions of the foreshore and the need to maintain a navigable channel, placing coarse woody debris that can be dislodged in high waters is not recommended.

Vegetation

To facilitate the restoration process, the following revegetation plan is recommended. It should be noted that the site will be deliberately over-planted to account for the expected mortality of juvenile plants. After re-grading the rock berm, topsoil should be placed in locations (determined by the QEP) between and under the rock fragments. Kinnikinnick (*Arctostaphylos uva-ursi*) plugs should be planted at one plug per square meter. The character of the rock berm will be modified through the removal of larger rock pieces (>40 cm), an activity that will reduce the height of the berm and make it more stable in the long term, as well as make it suitable for planting.

Atop the rock berm, twelve trees (six ponderosa pine and six Douglas fir) should be planted at a 2 m spacing to replace the trees removed during construction. If the birch sapling is harmed during the recontouring of the rock berm, then two birch trees should be planted in replacement to maintain adequate microsites. The total number of trees is inflated to account for a 50% survival rate following planting. The juvenile trees should be planted as container stock in the spring of 2023. In addition, any added topsoil should be covered with mulch to prevent erosion and maintain sufficient soil moisture.

Invasive species plant management should continue per the Riparian Area Management Plan in January 2022 (Appendix C).

Monitoring

We recommend that a QEP visit the site pre-construction, during, and post-construction. It is recommended to have a QEP on-site at least once during the rock berm works to direct the selection and placement of rock for fish habitat on the foreshore. If construction is expected to take longer than five days, a second site visit is recommended to ensure remediation activities are still on track before completion.

Post-completion monitoring of the site is recommended for two growing seasons following revegetation. It should consist of one site assessment by a QEP each spring/summer.

Monitoring for invasive species will also take place. The absence of Scotch broom and spotted knapweed is a priority as they can negatively affect the establishment of the targeted native plant species. Species identification support and removal processes have been provided to the property owner via the Riparian Area Management Plan in January 2022 (Appendix C).

Offsetting

To help ensure that riparian and fish habitat productivity lost at the property is restored to an equivalent or higher level, a donation of \$1,170.00 should be made to the Nature Conservancy of Canada (NCC), or an equivalent organization, to aid in Kootenay Lake riparian habitat restoration efforts. The cost was calculated based on information provided by NCC, indicating that restoration of high-quality riparian habitat costs about \$5.85 per m².

Costs

Below is a summary of estimated costs associated with the remediation plan, including costs for post-construction monitoring in years two and three.

Activity	Estimated timeline	Estimated cost
Earthworks	Spring 2023	\$ 6,200.00
Construction monitoring by a QEP	Spring 2023	\$ 8,700.00
Container plant stock & topsoil	Spring 2023	\$ 600.00
Offsetting donation	Winter 2022	\$ 1,170.00
Annual Inspection for years 1-3 by a QEP	Summer 2023 - 2025	\$ 3,600.00
TOTAL		\$ 20,270.00

Note: Costs are an estimate based on foreseeable work. Actual costs may differ pending on timelines, supplies, or altered work plans.

References

Fisheries and Oceans Canada. (2002). *Shoreline Care: A property owner's guide to conserving fish habitat in B.C.* <https://www.csr.bc.ca/sites/default/files/swmp/Shoreline%20Care.pdf>

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Appendix A: Site Photos

Figure 1. Excavator and fuel tank are unloaded on the north shore from a barge.



Image was taken on March 11, 2022

Figure 2. Overhead view of the south channel after the path was widened and cleared of debris.



Image was taken on March 13, 2022

Figure 3. Overhead view of the north channel after the path was widened and cleared of debris.



Image was taken on March 13, 2022

Figure 4. Cleaning the north channel to remove large boulders.



Image was taken on March 14, 2022

Figure 5. Northern shoreline facing west following boulder and rock removal.



Image was taken on March 18, 2022

Figure 6. Northern shoreline facing east following boulder and rock removal.



Image was taken on March 19, 2022

Figure 7. Overhead view of the south channel following boulder and rock removal.



Image was taken on March 27, 2022

Figure 8. Overhead view showing the location of the dismantled boathouse.



Image was taken on April 1, 2022

Figure 9. Overhead view of the north channel showing foreshore cleared of boulders and debris.



Image was taken on April 9, 2022

Figure 10. Overhead view of the site following construction activities.



Image was taken on June 30, 2022, by KES

Figure 11. The north channel facing west with sand above the natural lake boundary and coarse fragments on the foreshore.



Image was taken on June 30, 2022, by KES

Figure 12. The eastern shoreline of the north channel where trees were removed.



Image was taken on June 30, 2022, by KES

Figure 13. Rock berm along the eastern shore of the north channel.



Image was taken on June 30, 2022, by KES

Figure 14. A young paper birch tree unharmed by the rock berm.



Image was taken on June 30, 2022, by KES

Figure 15. Rock fragments along the eastern perimeter of the dismantled boathouse.



Image was taken on June 30, 2022, by KES

Figure 16. Spotted knapweed manually removed by KES during the June 30 site visit.



Image was taken on June 30, 2022, by KES

Figure 17. The northern end of the rock berm displaying a collection of woody debris deposited behind during high-water levels.



Image was taken on June 30, 2022, by KES

Figure 18. Location of the recommended construction of a machine access slope.



Image was taken on June 30, 2022, by KES

Schedule 4: *“RE: Riparian Area Assessment – 10377 Highway 3A, Gray Creek, BC”* prepared by Michael Keefer, PAg and dated March 06, 2023

March 6, 2023

Prepared for: Sadie Chezenko
Planner, Regional District of Central Kootenay

Prepared by: Keefer Ecological Services Ltd.

RE: Riparian Area Assessment – 10377 Highway 3A, Gray Creek, BC

This notice is to inform the RDCK that the Remediation Plan (RP), submitted on November 21, 2022 to the RDCK, is to be considered in conjunction with the Riparian Area Assessment Report (RAAR) [see Appendix B of the RP], for the purposes of a development permit application at 10377 Highway 3A.

The RAAR followed the criteria described in the Riparian Areas Protection Regulation (RAPR). The RP was prepared post-construction, following exceedances in the original RDCK development permit. Both the RP and RAAR have been prepared and signed by a Qualified Environment Professional (QEP).

Aside from the details outlined in the RP, no other conditions within the RAAR were altered. Therefore, we believe that the combination of the RP and RAAR provide adequate information to be considered compliant with the RDCK's terms of reference and development permit application guidelines

Sincerely,



Michael Keefer, PAg

Schedule 5: *“RE: Boathouse Removal – 10377 Highway 3A, Gray Creek, BC”* prepared by Michael Keefer, PAg and dated May 12, 2023

May 12, 2023

Prepared for: Sadie Chezenko
Planner, Regional District of Central Kootenay

Prepared by: Keefer Ecological Services Ltd.

RE: Boathouse Removal – 10377 Highway 3A, Gray Creek, BC

This notice provides further information regarding the removal of the boathouse associated with the Development Permit application for 10377 Highway 3A.

The boathouse immediately adjacent to the funicular base was removed in March 2022 after the owner began work under the previous Development Permit and approvals from the province. According to the owner, piles of rocks around the base of the boathouse that had accumulated had to be removed to allow the excavator to approach and adequately address the boulder work for the funicular. When these rocks were removed, the foundation of the boathouse appeared unstable and unsafe to work around. The owner communicated with the RDCK and the QEP. KES did not express concerns about removing the boathouse from an environmental perspective.

We believe the initial removal of the boathouse bears no negative environmental impact. The current state of the boathouse footprint has been left flat, level, and stable. It remains with a rocky/sandy substrate. The majority of the dismantled boathouse (wood panels and beams and metal roofing) have been saved for reuse/recycling. It is our opinion that no remediation is required for the area associated with the previous boathouse.

Sincerely,



Michael Keefer, PAg

Schedule 6: *"Riparian Area Assessment Report, 10377 Highway 3A, Gray Creek, BC"* prepared by Keefer Ecological Services LTD and dated January 13, 2022

Appendix B: Riparian Area Assessment Report

Riparian Area Assessment Report

10377 Highway 3A, Gray Creek, BC

Jessica Lowey, MSc, PAg
January 13, 2022



Keefer Ecological Services Ltd.
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Executive Summary

The assessed property is located at 10377 Highway 3A in Gray Creek, BC, on the east shore of Kootenay Lake. This report has been prepared for the Regional District of Central Kootenay (RDCK) as a pre-condition of the issuance of a building permit. This report is included as part of a Development Permit, as required under section 920 of the Local Government Act, and will be filed on the title of the assessed property. The report has been prepared for and at the expense of the owner of the assessed property. The authoring Qualified Environmental Practitioner (QEP) has not acted for or as an agent of the RDCK.

The assessment followed the Simple Assessment methodology as described in the Riparian Areas Protection Regulation (BC Reg. 178/2019). The SPEA width for this Simple Assessment is 15 m, given the vegetation category, fish-bearing status and permanence of Kootenay Lake. Existing and proposed development falls within the SPEA and below the TOB at the assessed property; however, the potential for adverse effects as a result of the proposed development is low. To address the potential for adverse effects to occur through uncontrolled works, the current owner of the assessed property has committed to developing and implementing a Mitigation Plan that is intended to ensure that there is no net loss to aquatic habitat productivity. The Mitigation Plan will be developed to include the management and mitigation measures presented herein.

Table of Contents

Executive Summary	i
Property Description.....	i
Existing and Planned Development.....	i
Riparian Area Assessment	iv
1. Methodology.....	iv
1.1. Determining Vegetation Category.....	iv
1.2. Determining Fish Bearing Status	iv
1.3. Determining Stream Permanence	v
1.4. Calculating SPEA Width.....	vii
2. Fisheries Resource Values.....	vii
3. Determination of SPEA Width	viii
Discussion of Existing and Potential Impacts	xi
Proposed Management and Mitigation Measures.....	xii
References	xv

List of Tables

Table 1. Kootenay Lake shoreline habitat assessment summary (Kootenay Lake Partnership, 2021).	viii
Table 2. Site-specific determination of SPEA width (assessed property segments highlighted).	viii

List of Figures

Figure 1. Existing development in the lower portion of the assessed property.	ii
Figure 2. Top (left) and bottom (right) points of the proposed funicular.	iii
Figure 3. Location of proposed floating dock and gangway.....	iii
Figure 4. Riparian area assessment boundaries.	vi
Figure 5. Determining SPEA widths for the Simple Assessment.	vii
Figure 6. Upstream (left) and downstream (right) shorelines outside the assessed property.	ix
Figure 7. SPEA determination for the assessed property.....	x
Figure 8. Invasive plant species found within the assessed property boundaries.....	xiv

Property Description

The assessed property is approximately 3 hectares (ha) and is located at 10377 Highway 3A, Gray Creek, BC, on the east shore of Kootenay Lake. The legal description for the assessed property is Lot 2 Plan NEP4523 District Lot 4595 Land District 26 (Kootenay). The Parcel Identification number (PID) is 010-421-874. The current owner of the assessed property is Bevan May who purchased the property in 2021.

Existing and Planned Development

A two-storey house on a concrete foundation currently exists on the upper portion of the assessed property, immediately west of Highway 3A. The house was constructed in 1963 and has likely experienced several renovations since that time. On the south side of the house is a small greenhouse and the septic field. On the north side of the house, a wooden staircase connects the upper portion of the assessed property to the lower portion where a boat house, rail system, deck and storage shed are located. A cliff approximately 30 meters (m) in height separates the upper and lower portions of the assessed property. Other existing infrastructure found in the lower portion of the assessed property includes a decommissioned hydro pole and scrap wiring, other decommissioned electrical equipment (e.g., light on the shoreline), and several water lines that run from the waters edge up the cliff to the house above (Figure 1).



Figure 1. Existing development of the assessed property.

The proposed development includes the installation of a funicular (a cable and rail system) intended to connect the upper and lower portions of the assessed property from a point on the western edge of the upper portion to a point above the high water mark in the lower portion (Figure 2), and a floating dock extending from gangway secured into the bedrock along the western shoreline, where a non-permanent deck area built of wood currently exists (Figure 3).



Figure 2. Top (left) and bottom (right) points of the proposed funicular.



Figure 3. Location of proposed floating dock and gangway.

The proposed development does not include the removal of trees or soil materials from the assessed property, nor does it potentially increase the overall risk of erosion and sedimentation at the site. The

proposed installation of a funicular will require the removal or relocation of boulders at the base of the cliff, and the removal of a small area (approximately 5 square meters (m²)) of shrubs (saskatoon (*Amelanchier alnifolia*)) and overburden (forest litter on top of bedrock) at the top of the cliff. The installation of the gangway will require no vegetation removal or earthworks, rather the securing of the gangway into the exposed bedrock along the western shoreline.

Riparian Area Assessment

Qualifications of the Assessor

Ms. Lowey is a registered Professional Agrologist in good standing with the British Columbia Institute of Agrologists (BCIA) in the practice areas of environmental impact assessment and mitigation planning; soil and land conservation, reclamation planning and management; and, vegetation identification, assessment and management. As of the date of this report, Ms. Lowey has conducted several Riparian Area Assessments following the methodology detailed below. She has successfully led projects into compliance with applicable Regulation, including others within the jurisdiction of the Regional District of Central Kootenay (RDCK). At KES, Ms. Lowey has access to a variety of technical experts, including other Professional Agrologists, Professional Foresters, and Professional Biologists.

Methodology

The assessment followed the Simple Assessment methodology as described in the Riparian Areas Protection Regulation (BC Reg. 178/2019). The Simple Assessment establishes Streamside Protection and Enhancement Area (SPEA) widths based on certain stream characteristics – fish-bearing status, nature of stream flows, and the status of streamside vegetation. These widths have been established for the protection of fish habitat while taking into consideration existing development (i.e., permanent structures).

1. Determining Vegetation Category

The vegetation category is assessed within a 30 m wide area starting from the middle of the assessed property and going 200 m both upstream and downstream along the bank where the development will occur. Within the 30 m and 200 m assessment boundaries, the distance from the top of bank (TOB) to the first permanent structure was estimated at 40 m intervals (Figure 4). An air photo was used to undertake this measurement prior to inspecting the site in person. While on site, KES utilized a drone to improve the quality of the available aerial photos of the site for the purposes of this assessment.

2. Determining Fish Bearing Status

Fish bearing streams are ones in which fish are present or potentially present if introduced obstructions could be made passable. Using publicly available information on the waterbody, the fish bearing status of Kootenay Lake was confirmed. The following sources of information were consulted:

- iMapBC Fresh Water Atlas
- BC Habitat Wizard
- Kootenay Lake Shoreline Inventory Mapping

3. Determining Stream Permanence

Stream flow permanence is a factor only in determining a SPEA on non-fish-bearing streams. Kootenay Lake is a permanent water feature, that does not dry up.



Figure 4. Riparian area assessment boundaries.

4. Calculating SPEA Width

Using the three aforementioned characteristics, SPEA width is determined using Figure 5. The Riparian Areas Protection Regulation (BC Reg. 178/2019) defines the TOB for a floodplain area not contained within a ravine as the edge of the active floodplain of a stream where the slope of the land beyond the edge is flatter than 3:1 at any point for a minimum distance of 15 m measured perpendicularly from the edge. This definition of the TOB is suitable for the assessed property; however, the alternative definition for TOB applies for the areas 200 m up and downstream of the assessed property. In these areas, the TOB is defined as a break in the slope of the land such that the grade beyond the break is flatter than 3:1 at any point for a minimum distance of 15 m measured perpendicularly from the break.

Vegetation Category	Existing or potential streamside vegetation conditions	Streamside Protection and Enhancement Area Width*		
		Fish bearing	Non-Fish bearing	
			Permanent	Non Permanent
1	Continuous areas \geq 30 m or discontinuous but occasionally > 30 m to 50 m	30 m		Minimum 15 m Maximum 30m Refer to Figure 2-2
2	Narrow but continuous areas = 15 m or discontinuous but occasionally > 15 m to 30 m	Minimum 15 Maximum 30 Refer to Figure 2-2	15 m	
3	Very narrow but continuous areas up to 5 m or discontinuous but occasionally > 5 m to 15 m	15 m	Minimum 5m Maximum 15 m Refer to Figure 2-3	

Figure 5. Determining SPEA widths for the Simple Assessment.

Fisheries Resource Values

Kootenay Lake is a fish bearing waterbody that is managed for angler use. Kootenay Lake supports many different fish species, both native and invasive. Species present include longnose dace, torrent sculpin, rainbow trout, kokanee, slimy sculpin, brook trout, mountain whitefish, reidside shiner, peamouth chub, northern pikeminnow, bull trout, white sturgeon, pygmy whitefish, yellow perch, burbot, westslope cutthroat trout, longnose sucker, leopard dace, largescale sucker, prickly sculpin, bridgelip sucker, lake whitefish, dolly varden, carp, pumpkinseed, and largemouth bass. Known key fish habitat present in Kootenay Lake includes spawning, rearing, living and foraging, and migration corridors.

The shoreline at the assessed property is rocky. There was no woody debris observed along the shoreline below the HWM. This observation is consistent with adjacent properties. Above the HWM extensive amounts of woody debris were observed, naturally accumulating in pools/bays along the shoreline both up and downstream of the assessed property. There were no turbulent water features (e.g., riffles, cascades), undercut banks or in-stream vegetation observed along the shoreline of the assessed property or adjacent properties. The Kootenay Lake Shoreline Guidance Document (Kootenay Lake Partnership, 2020) assessed the same segment of shoreline as having no evidence or low potential for aquatic habitat for the species listed in Table 1, with the exception of juvenile rearing habitat. Bird habitat potential was also observed. The field assessment did not yield any evidence of nests, although tree nesting habitat exists up and downstream of the assessed property. No evidence of raptors was

observed through the field assessment, although raptor breeding occurrence in the Kootenay/Boundary region does not typically commence until April (Ministry of Forests, Lands, Natural Resource Operations and Rural Development, 2013).

Table 1. Kootenay Lake shoreline habitat assessment summary (Kootenay Lake Partnership, 2021).

Habitat Assessed	Habitat Potential	Habitat Assessed	Habitat Potential
White sturgeon spawning	No	Red- or Blue-listed species	Yes
Bats	No	Fish staging	No
Raptors	Yes	Fish migration	No
Heron	No	Salmon spawning	No
Nests	Yes	Juvenile rearing	Moderate
Amphibians	No	Kokanee spawning	No

The riparian area vegetation of the assessed property and adjacent properties is predominantly dry conifer forest (ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*)) which sometimes extends to the HWM but does not overhang the waterbody. Much of the vegetation is contained to the TOB as the exposed bedrock cliffs between the TOB and the HWM are steep and free of soil materials, with the exception of the assessed property. Very little of the riparian area vegetation on the assessed property and neighbouring properties has been modified through clearing activities or other anthropogenic factors. Other species observed include saskatoon, Oregon grape (*Mahonia aquifolium*), common juniper (*Juniperus communis*), Wood's rose (*Rosa woodsii*), yarrow (*Achillea millefolium*), round-leaved alumroot (*Heuchera cylindrica*), and falsebox (*Pachistima myrsinites*). Two invasive plant species were observed on and adjacent the assessed property, including spotted knapweed (*Centaurea stoebe*) and scotch broom (*Cytisus scoparius*).

Determination of SPEA Width

The vegetation category was determined to be 3 (Figure 5), based on the details provided in This assessment was difficult given the irregular shape of the shoreline and the steep slopes up and downstream of the assessed property. Within the assessed property, the TOB lies outside the 30 m area used for determining the vegetation category in two instances (segments 5 and 6). This is attributed to the irregular shape of the shoreline in those segments (Figure 7). In the areas up and downstream of the assessed property, the shoreline rises steeply away from the HWM, unlike at the assessed property (Figure 6). This resulted in the TOB moving eastward towards the highway (the TOB is located alongside the highway, where the slope breaks). Using the determined vegetation category, fish-bearing status of Kootenay Lake and its permanence, KES has determined that the SPEA width for the assessed property is 15 m (Figure 5; Figure 7).

Table 2. This assessment was difficult given the irregular shape of the shoreline and the steep slopes up and downstream of the assessed property. Within the assessed property, the TOB lies outside the 30 m

area used for determining the vegetation category in two instances (segments 5 and 6). This is attributed to the irregular shape of the shoreline in those segments (Figure 7). In the areas up and downstream of the assessed property, the shoreline rises steeply away from the HWM, unlike at the assessed property (Figure 6). This resulted in the TOB moving eastward towards the highway (the TOB is located alongside the highway, where the slope breaks). Using the determined vegetation category, fish-bearing status of Kootenay Lake and its permanence, KES has determined that the SPEA width for the assessed property is 15 m (Figure 5; Figure 7).

Table 2. Site-specific determination of SPEA width (assessed property segments highlighted).

Segment Assessed	Distance to First Permanent Structure
1	5 m
2	4 m
3	3.5 m
4	20 m
5	6.5 m
6	6 m
7	12 m
8	15 m
9	4.5 m
10	5.5 m
11	5 m
Average	8 m



Figure 6. Upstream (left) and downstream (right) shorelines outside the assessed property.



Figure 7. SPEA determination for the assessed property.

Discussion of Existing and Potential Impacts

Existing disturbances were observed to be stable. No evidence of erosion or sedimentation was observed to be associated with the existing disturbances within 30 m of the high water mark, including within the SPEA. Soils of the upper portion of the assessed property are shallow and well vegetated with either grass, ornamental plants or native trees and shrubs. Limited soil resources (e.g., predominantly sand) and considerable amounts of exposed bedrock exist throughout the lower portion of the assessed property. Where soil or vegetation exists in the lower portion, they were observed to be stable. Two invasive plant species (spotted knapweed and scotch broom) were observed in the lower portion of the assessed property, likely a result of encroachment from the roadside, as well as within 200 m up and downstream of the assessed property.

Disturbances within 30 m of the high-water mark include:

- Lower portion of the assessed property:
 - Deck
 - Rail system
 - Boathouse
 - Storage shed
 - Fire pit
 - Water lines
 - Decommissioned electrical supply
 - Staircase
- Upper portion of the assessed property:
 - Staircases
 - House
 - Garage / Carport
 - Driveway
 - Greenhouse
 - Septic field

Vegetation within the riparian area includes:

- Ponderosa pine (*Pinus ponderosa*)
- Douglas fir (*Pseudotsuga menziesii*)
- Oregon grape (*Mahonia aquifolium*)
- Common juniper (*Juniperus communis*)
- Wood's rose (*Rosa woodsii*)
- Yarrow (*Achillea millefolium*)
- Round-leaved alumroot (*Heuchera cylindrica*)
- Falsebox (*Pachistima myrsinites*)
- Spotted knapweed (*Centaurea stoebe*; invasive)
- Scotch broom (*Cytisus scoparius*; invasive)

All of the proposed development (funicular, dock and gangway) is located within 15 m of the high water mark, or the Environmentally Sensitive Development Permit (ESDP) Area, as defined by the RDCK Land Use Bylaw (No. 2315, 2015). The upper portion of the assessed property is estimated at 30 m elevation (vertical distance) above the high water mark and greater than 15 m from the HWM (horizontal distance). Thus, the potential impacts of the proposed development work in this portion of the assessed property are not expected to cause adverse effects to terrestrial or aquatic habitats, or drinking water quality. The proposed funicular installation requires minor amounts of forest floor materials to be removed from the top of the cliff where two rods/pilings will be bored into bedrock. The forest floor materials in this location were observed to be very shallow, predominantly consisting of pine needle litter, and directly on top of exposed bedrock. The clearing in this area will also require that one cluster of saskatoon shrubs are removed. Neither of these tasks require the removal of mature trees from the assessed property. All proposed work in the upper portion of the assessed property is greater than 15 m from the high water mark; thus, falling outside the ESDP Area.

The base of the funicular, as well as the proposed dock and gangway, occur within 15 m of the highwater mark in the lower portion of the assessed property. The construction of the base of the funicular requires that three large pieces of dislodged bedrock are moved or crushed into smaller pieces. The base of the funicular will be secured directly into bedrock at the base of the cliff (Figure 2). The base of the funicular is situated immediately above the high water mark. The dock and associated gangway, located along the western shoreline of the assessed property, will also require direct securement into the exposed bedrock in this location (Figure 3). The top of the gangway will be secured in place above the high water mark. The dock will be a floating structure secured to the end of the gangway. No disturbance of soil or vegetation is required for the proposed work in the lower portion of the assessed property, within the ESDP Area.

Proposed Management and Mitigation Measures

The following proposed management and mitigation measures are intended to ensure no adverse effects to the terrestrial or aquatic habitat, or drinking water quality, through the work. These management and mitigation measures will be implemented throughout the proposed work by the property owner with assistance from a QEP.

1. Communication Plan

All site personnel will be informed of their obligation to protect the terrestrial, aquatic and drinking water values at the assessed property through the proposed work. This includes limiting disturbance footprints within the SPEA, and operating from above the TOB whenever practicable. For the proposed dock work, a barge will be used and work conducted from the water. Spill response, if required, will follow provincial guidelines.

2. *Equipment*

Cleaning procedures will be implemented for all incoming equipment, including footwear, to avoid the introduction of both terrestrial and marine invasive plant species. Equipment will not be permitted to perform work on the assessed property if it is not free from mud, debris, vegetation, etc.

3. *Vegetation Removal*

Vegetation removal will be minimal and only as required for the installation of the top of the funicular. This is expected to include the removal of one group of saskatoon shrubs from the western edge of the cliff in the upper portion of the assessed property. No mature trees are scheduled to be removed. Along with the vegetation removal, the area will be stripped of all forest litter that lies on top of exposed bedrock. This removal of material will occur in a controlled manner and will not be pushed down the cliff to the lower portion of the assessed property. All removed materials will be stockpiled on the upper portion of the assessed property, away from the cliff edge, until otherwise disposed of or managed per the approved best management practices for instream works (Province of BC, 2004).

4. *Invasive Plant Control*

Two invasive plant species were observed on the assessed property and are presumed to have originated from populations along the side of the highway (Figure 8). These species were also observed 200 m up and downstream of the assessed property. Spotted knapweed (*Centaurea stoebe*) should be manually removed and chemically controlled, with extra care taken in its application given the proximity to the high water mark. Existing spotted knapweed skeletons should be carefully removed in such a manner that reduces the likelihood of spreading seeds in the process. Scotch broom (*Cytisus scoparius*) should also be removed through manual and chemical means. Plants should be dug or pulled, taking care to remove as much of the root as possible. Scotch broom may also be controlled via chemical means in the spring.



Figure 8. Invasive plant species found within the assessed property boundaries.

5. *Dust Control*

Where concrete or bedrock is cut, drilled or sanded, care will be taken to ensure that airborne dust or fine dust accumulating in water used as a lubricant (if used) is not allowed to adversely impact the surrounding terrestrial or aquatic habitat. The amount of dust anticipated through the proposed work is minimal, but controls should be in place as part of the owner/contractor's due diligence. Approved best management practices for instream works (Province of BC, 2004) provide details for the use of erosion and sediment control measures that would be applicable for this work, including the construction of diversions within the work area so that sediment-laden water does not directly enter the stream.

References

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Schedule 7: *"Riparian Area Management Plan, 10377 Highway 3A, Gray Creek, BC"* prepared by Keefer Ecological Services LTD and dated January 24, 2022

Appendix C: Riparian Area Management Plan

Riparian Area Management Plan

10377 Highway 3A, Gray Creek, BC

Jessica Lowey, MSc, PAg
January 24, 2022



Keefer Ecological Services Ltd.
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Cranbrook, BC V1C 6X7
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Proposed Management and Mitigation Measures

The following proposed management and mitigation measures are intended to ensure no adverse effects to the terrestrial or aquatic habitat, or drinking water quality, through the work.

6. *Communication Plan*

All site personnel will be informed of their obligation to protect the terrestrial, aquatic and drinking water values at the assessed property through the proposed work by the authoring Qualified Environmental Professional (QEP). This includes limiting disturbance footprints within the Streamside Protection Enhancement Area (SPEA), and operating from above the Top of Bank (TOB) whenever practicable, or alternatively, from a barge with work being conducted from the water, as needed. Spill response, if required, will follow provincial guidelines and will be the responsibility of the equipment operator.

The authoring QEP will be on site for the start of the proposed work to communicate requirements and expectations, and to observe the work procedures. The QEP will direct, observe and record details of the work that occurs while on site, including details of a pre-construction kickoff meeting (when, where, who, topics discussed, questions asked, etc.), equipment inspection, any changes to the work plan, mitigation measures implemented, the effectiveness of those mitigation measures, and the amount of work completed while on site. Any work that occurs without direct supervision of the QEP will be documented by the property owner and submitted to the QEP for inclusion in the Project Completion Report.

1. *General Measures to Protect Fish and Riparian Areas*

- No application of herbicides within 2 meters (m) of the high water mark.
- Herbicide use will target only invasive vegetation.
- Herbicide use will not remove native vegetation or be used to brush an area.
- Trees will be felled directionally away from the shoreline to minimize disturbance to the riparian area.
- No deleterious substances are allowed to enter the waterbody, including fuels and lubricants, debris, dust, herbicide products, or sediment.
- Equipment or vehicles will not be washed along the shore of any body of water.
- No equipment will be serviced or refueled any less than 30 m from a body of water.
- Watercourses will not be diverted, blocked, or restricted, except temporarily to correct hazardous situations, or in an emergency.

7. *Equipment*

Cleaning procedures will be implemented for all incoming equipment, including footwear, to avoid the introduction of both terrestrial and marine invasive plant species. Equipment will not be permitted to perform work on the assessed property if it is not free from mud, debris, vegetation, etc. The QEP on site will inspect all equipment and record findings.

8. Vegetation Removal

Vegetation removal will be minimal and only as required for the installation of the top of the funicular. This is expected to include the removal of one group of saskatoon (*Amelanchier alnifolia*) shrubs from the western edge of the cliff in the upper portion of the assessed property. No mature trees are scheduled to be removed. Along with the vegetation removal, a small area will be stripped of all forest litter that lies on top of exposed bedrock, prior to drilling and placing steel rods to support the top of the funicular. This removal of material will occur in a controlled manner and will not be pushed down the cliff to the lower portion of the assessed property. All removed materials will be stockpiled on the upper portion of the assessed property, away from the cliff edge, until otherwise disposed of or managed per the approved best management practices for instream works (Province of BC, 2004).

The proposed vegetation removal at the assessed property is minor and does not warrant any restoration activities. Details pertaining to the vegetation removal work will be discussed with the property owner and contractor(s) while the QEP is on site to ensure best management practices are followed, and the removal occurs in an environmentally safe manner.

9. Invasive Plant Control

Two invasive plant species were observed on the assessed property and are presumed to have originated from populations along the side of the highway (Figure 8). These species were also observed 200 m upstream and downstream of the assessed property.

1. Spotted Knapweed

Spotted knapweed (*Centaurea stoebe*) will be manually removed by the property owner. The QEP will review species identification with the property owner and will provide reference guides for future control needs. The QEP will discuss the possibility of chemically controlling the species, with extra care taken in its application given the proximity to the high water mark, as needed to initially control the species' establishment. Existing spotted knapweed skeletons will be carefully removed in such a manner that reduces the likelihood of spreading seeds in the process, and removes as much plant material (including roots) as possible with minimal soil disturbance.

Mechanical control notes:

- Pulling, cutting or mowing is most effective when completed prior to seed set. If the plants have not yet flowered, the removed plants can be left onsite, but stems should be twisted, bent or otherwise crimped.
- If manual removal is occurred while flowers are present on stems, the plants must be bagged and removed from the site to prevent production of viable seeds.
- Whenever/wherever possible, the root system should be removed to prevent re-sprouting; however, stem removal and prevention of seed set is most important.
- Follow-up treatments will be required as knapweed has an extensive, long-lived seed bank.

Chemical control notes:

- Herbicides are effective against knapweed, including “Round Up”.
- Careful attention must be paid to minimize non-target damage (i.e., implementing selective application).
- There will be no application of herbicides within 2 m of the high water mark.
- Herbicide use should only be considered if population numbers are overwhelmingly high for manual removal methods.

2. Scotch Broom

Scotch broom (*Cytisus scoparius*) will also be removed, primarily, through manual means. The QEP will review species identification with the property owner and will provide reference guides for future control needs. The QEP will discuss the possibility of chemically controlling the species, as with spotted knapweed. Plants should be dug or pulled, taking care to remove as much of the root as possible.

Mechanical control notes:

- Minimizing soil disturbance, cut larger plants below ground level before flowering and seed set. Plants with stems less than 1.5 m in diameter may be hand pulled, preferably in late spring when the plant is directing its energy into flower and seed production.
- Mechanical control is most effective if all of the plant is removed, no seeds are dropped and soil disturbance is minimized.
- Hand pulling may encourage growth due to the high level of soil disturbance. If this is the case, plants can be cut as close to the ground as possible.
- Due to enormous seed banking and re-sprouting potential (stumps and roots), mechanical treatments may need to be implemented over many years.

Chemical control notes:

- Herbicides are effective against knapweed, including “Round Up”.
- Careful attention must be paid to minimize non-target damage (i.e., implementing selective application), including the use of cut surface application.
- There will be no application of herbicides within 2 m of the high water mark.
- Herbicide use should only be considered if population numbers are overwhelming high for manual removal methods.



Figure 9. Invasive plant species found within the assessed property boundaries (spotted knapweed (left), scotch broom (right)).

10. Dust Control

Where concrete or bedrock is cut, drilled or sanded, care will be taken to ensure that airborne dust or fine dust accumulating in water used as a lubricant (if used) is not allowed to adversely impact the surrounding terrestrial or aquatic habitat. The amount of dust anticipated through the proposed work is minimal, but controls (such as using water) should be in place as part of the owner/contractor's due diligence. Approved best management practices for instream works (Province of BC, 2004) provide details for the use of erosion and sediment control measures that would be applicable for this work, including the construction of diversions within the work area so that sediment-laden water does not directly enter the stream. The QEP will review, discuss, observe and record the implementation and effectiveness of erosion and sediment control measures on site.

The proposed work is scheduled to occur between the TOB (start of the SPEA) and high water mark at the assessed property. Given the topography of the assessed property, this area will be used to filter sediment-laden water used for dust control, despite best management practices in Riparian Areas Protection Regulation Technical Assessment Manual (2019). Careful consideration will be used when planning the location of sediment control measures to minimize the potential for adverse impacts to the adjacent waterbody or any exposed lakebed sediments.

1. General Sediment Control Best Management Practices

- Conduct work during periods of low flow, and during least-risk timing windows for relevant fish species.

- Put sediment control measures in place before starting any works that may result in sediment mobilization.
- Minimize the amount of soil disturbance.
- Construct ditches, water bars, or water diversions within the work areas so they do not directly discharge sediment-laden surface water flows into a waterbody.
- Utilize sediment traps and silt fencing.

11. Project Completion Report

The QEP will draft a Project Completion Report following the completion of all permitted works at the site. The QEP is only anticipated to be on site for the first day of construction with any additional work documented by the property owner. Daily updated will be provided to the QEP for work that is conducted without direct oversight, and all documentation will be shared with the QEP for inclusion in the final report. The RDCK may require the QEP to conduct a post-construction site visit.

References

Province of BC. (2004). Standards and Best Practices for Instream Works. Retrieved from <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/iswstdsbpsmarch2004.pdf>

Ministry of Forests, Lands, Natural Resource Operations and Rural Development. (2019). Riparian Areas Protection Regulation Technical Assessment Manual. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/fish-fish-habitat/riparian-areas-regulations/rapr_assessment_methods_manual_for_web_11.pdf